OPERATING INSTRUCTIONS

FOR

CARTRIDGE, 40mm FLOATING FLARE,

AND

CARTRIDGE, 40mm FLOATING SMOKE MARKER
(40mm TARGET MARKER, FLOATING, TMF-1)

March 1974

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U. S. ARMY LAND WARFARE LABORATORY
Aberdeen Proving Ground, Maryland 21005

WARNING

DANGEROUS PROCEDURES such as pointing muzzle of grenade launcher in direction of personnel when loading, clearing, zeroing, or firing could result in injury or death of personnel.

Failure to place safety in "safe" position when grenade launcher is loaded but not immediately fired could result in injury or death of personnel if grenade launcher is accidentally fired.

Do not fire these cartridges so that falling components could descend upon friendly troops, thereby possibly causing injury or death. The body assembly and the ogive assembly normally fall about 10 meters (maximum of 20 meters) short of the payload impact point.

WARNING

DANGEROUS CONDITIONS. After a failure to fire, all personnel not required for the removing of the round must be cleared from the vicinity.

If a noticeable difference in sound or recoil is experienced, further firing should be suspended. This could indicate that the projectile has not been propelled with sufficient force to clear the bore. If firing is continued, it could result in a blown-up grenade launcher.

WARNING

AMMUNITION DESTRUCTION by any type of mechanical means could result in injury or death.

CAUTION

A fire hazard exists when either of these markers impacts on flammable material (grass, leaves, etc.)...a considerable hazard with the flare but only a slight hazard with the smoke marker. Therefore, prior to firing, the user should evaluate the consequence of starting a fire in the impact area.

ADDITIONAL FIRING PRECAUTIONS are presented in Paragraph 10.

CHAPTER 1

INTRODUCTION

1. SCOPE

a. These instructions are for use by personnel to whom this ammunition is issued. They apply to the 40mm Floating Flare and Smoke Marker Cartridges. The latter cartridge also is known as the 40mm Target Marker (Floating) TMF-1.

b. These instructions also have been prepared to provide data for future inclusion in the appropriate chapters of technical and field manuals including:

(1) TM9-1010-205-12, Operator's and Organizational Maintenance Manual: 40mm Grenade Launcher, M79.

(2) TM9-1010-221-14, Operator's, Organizational, DS, and GS Maintenance Manual Including Repair Parts and Special Tools Lists: 40mm Grenade Launcher M203.

(3) FM 23-31, 40mm Grenade Launchers, M203 and M79.

c. These instructions cover technical and general information pertaining to these rounds (cartridges); their care, handling, and preservation; preparation for firing; precautions in firing; packing and marking.

d. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Land Warfare Laboratory, ATTN: AMXLW-DEF, Aberdeen Proving Ground, Maryland 21005.

e. An explosive ordnance disposal (EOD) manual has been prepared for the smoke cartridge. It is entitled, "Department of the Army Technical Bulletin, TB 75-15-165, Explosive Ordnance Disposal Advance Information for 40mm Target Marker (Floating) TMF-1, June 1971." An EOD manual for the flare cartridge is being prepared.

2. CLASSIFICATION

These cartridges are classified as pyrotechnic signal and spotting rounds. They include:

CARTRIDGE, 40mm:	Yellow Floating Flare
CARTRIDGE, 40mm:	Green Floating Flare
CARTRIDGE, 40mm:	Red Floating Flare
CARTRIDGE, 40mm:	Yellow Floating Smoke Marker
CARTRIDGE, 40mm:	Green Floating Smoke Marker
CARTRIDGE, 40mm:	Red Floating Smoke Marker

CHAPTER 2

DESCRIPTION AND FUNCTIONING

3. GENERAL

a. The 40mm Floating Flare and Floating Smoke Marker Cartridges, Figures 1 and 2, provide small floating position markers for use in inundated areas.. water, mud, and snow.

b. These cartridges are for use with the M79 and the M203 40mm Grenade Launchers. They are fired at standoff ranges of up to 280 meters for the flare and 300 meters for the smoke marker. The red, yellow, and green flares burn for 80 - 100 seconds and can be identified at an aerial slant range of more than 2 miles on a clear night. The red and yellow smoke markers burn for 60 - 90 seconds and can be identified at an aerial slant range of more than 2 miles on a clear day.

c. These cartridges are of the fixed ammunition type. The two major assemblies comprising the complete round are the cartridge case and the projectile.

d. Identification of these cartridges is by markings on the cartridge. Identification data for the cartridge case is marked on the cartridge case, which is chemically finished to obtain a green color. Identification data for the complete round is marked on the body of the projectile, which is light green in color. Identification markings are similar to those for the 40mm Smoke Canopy Cartridges as shown in Figure 7-8 of TM9-1010-221-14 (Appendix A). (Note: Final color coding for body and ogive is a subject for future determination.)

e. Development efforts for these cartridges were initiated based on needs observed in Vietnam; these requirements later were incorporated into an existing requirement document entitled "Materiel Need (Engineering Development) (QMR) for Signals, Ground, 40mm Weapon Launched."

4. DESCRIPTION

a. Major and interchangeable components ... These 40mm floating signals are composed of a cartridge case assembly, a body assembly, a marker assembly, and an ogive assembly (Figure 3); the body, marker, and ogive assemblies comprise the projectile. All of the components except those of the marker assembly are interchangeable with those of other 40mm signals developed under the Materiel Need (QMR). However, final end items would have different color codes and embossed ogives may be employed to provide identification at night. These two signals also have many common parts in the marker assemblies as indicated in the following paragraphs.

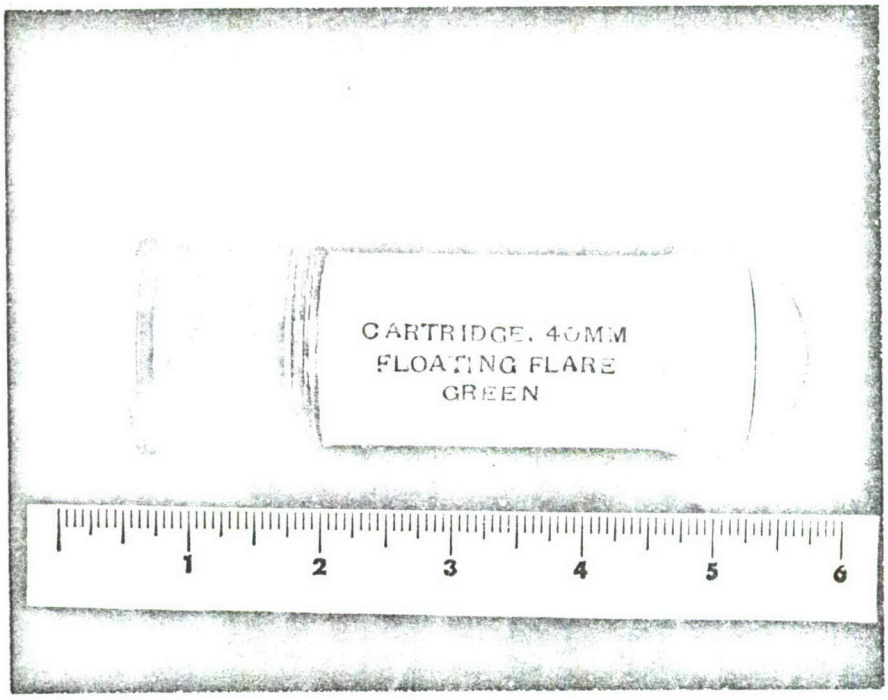


Figure 1. 40mm Floating Flare Cartridge

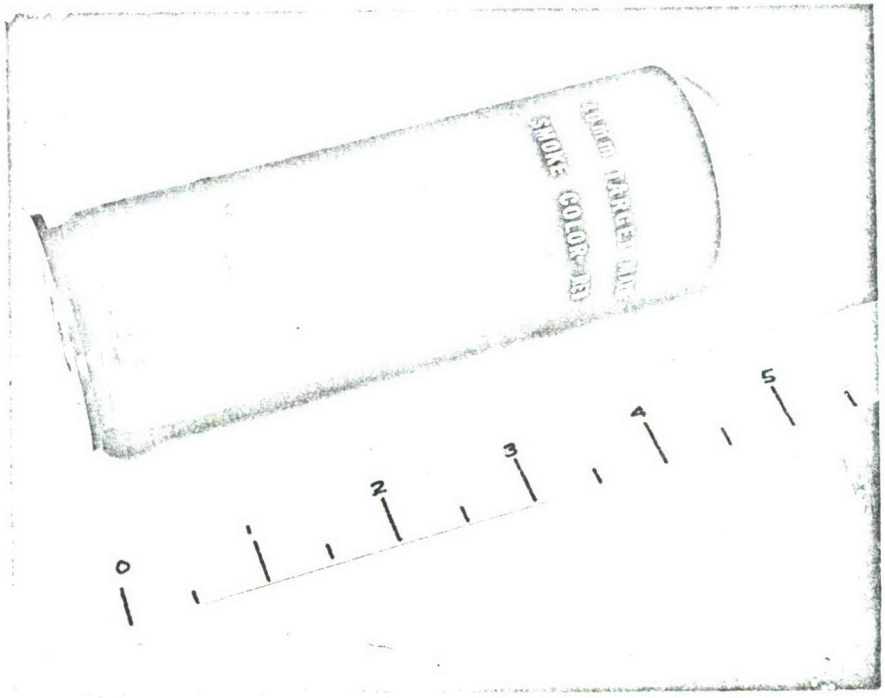


Figure 2. 40mm Floating Smoke Marker Cartridge
(40mm Target Marker, Floating, TMF-1)

b. Components comprising the end item:

(1) 40mm Cartridge Case Assembly ... The 40mm Cartridge Case M195 consists of an aluminum cartridge case, a percussion primer, and a propelling charge. The primer and charge are located in the base of the case as shown in Figure 3. Expanding gases from the propelling charge pass through six holes in the periphery of the propelling charge housing to propel the projectile (the body/marker/ogive assembly) from the case and to simultaneously ignite the delay charge, which is located at the base of the projectile (body assembly).

(2) Body Assembly ... The body assembly consists of a body housing, a delay assembly, and a bearing plate.

(a) Body Housing ... The body housing is an aluminum cylinder with an integral base at one end. The base, which receives the delay assembly, is contoured to fit into the 40mm cartridge case assembly.

(b) Delay Assembly ... The delay assembly is screwed (left hand) into the center of the base of the body housing. The delay composition is ignited by the propelling charge and burns through in approximately 5-1/2 seconds. This delay permits the projectile to travel through most of its trajectory before spitting flame through the chimney to ignite the first-fire (ignition) composition.

(c) Bearing Plate ... The bearing plate is bonded to the inside of the base of the body housing; it withstands the set-back forces that result when the cartridge is fired.

(3) Marker Assembly ... The marker assembly, which telescopes into the body assembly, consists of a loaded canister subassembly and a chimney/ballute subassembly.

(a) Loaded Canister Subassembly ... The loaded canister subassembly is composed of a formed aluminum canister, a phenolic liner, an ignition composition, and a flare or smoke composition. The phenolic liner, which acts as an insulator, is placed into the canister before the flame/smoke composition is pressed in. The ignition composition is pressed onto the base of the flame/smoke mix to act as a first fire and to expel the marker assembly from the body assembly. The burning composition inflates the ballute in addition to supplying the signal. The base of the aluminum canister is crimped into a groove at the forward end of the chimney housing.

(b) Chimney - Ballute Subassembly ... The chimney of the smoke marker is aluminum; however, steel is used in the flare because of the higher temperatures involved. The chimney serves three functions: first, it provides a support for the ballute (balloon-parachute); second, it provides an emission port for the flame or smoke; and last, it provides three holes for venting a portion of the combustion gases into the ballute to inflate it. The inflated ballute retards the descent of the payload in addition to acting as a flotation device after water impact, holding the marker assembly in an upright orientation. The donut-shaped ballute of the smoke marker is composed of two

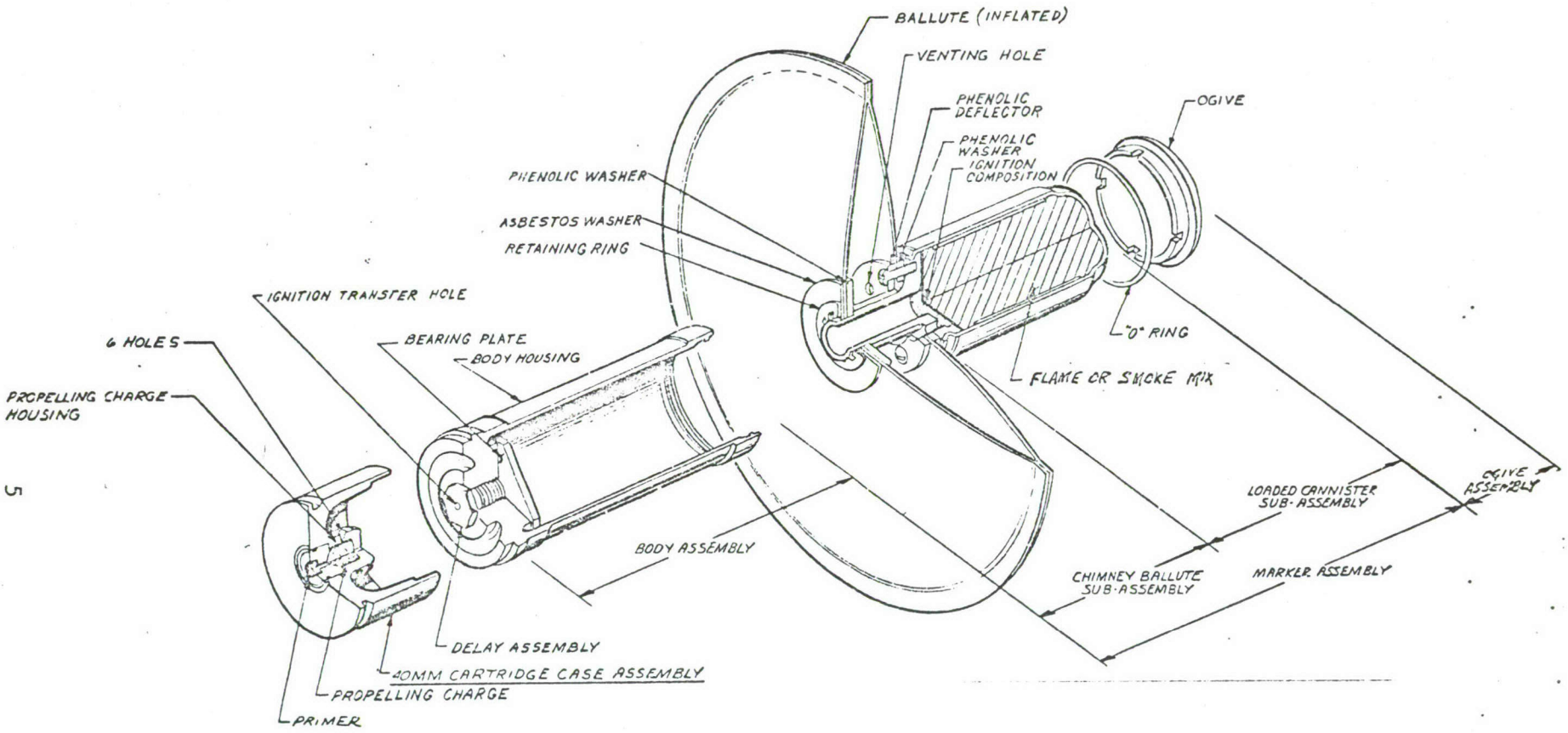


Figure 3. Exploded View, 40mm Floating Signals

6-inch circular pieces of cotton fabric waterproofed with a silicone coating. The centers of these pieces are affixed to the chimney and the circumferences sewn together. An asbestos disc at the rear of the ballute prevents the fabric from being damaged by the flash of the delay. Because of higher temperatures, the ballute of the flare is made from a silicone-rubber-coated glass fabric.

(4) Ogive Assembly ... The ogive assembly consists of the ogive and an O-ring. The ogive is a molded plastic cap which snaps into a groove at the front of the body assembly. The O-ring provides a waterproof seal at the joint between the ogive and the body assembly.

5. COMPLETE ROUND FUNCTIONING

When the signal cartridge is fired, the primer flash ignites the propelling charge (A, Figure 4), which expels the projectile from the grenade launcher following a ballistic path toward the target. The flame from the propelling charge also ignites the pyrotechnic delay charge in the base of the projectile. The delay charge burns through in approximately 5-1/2 seconds and, spitting flame through the chimney, it ignites the first-fire (ignition) mix on the base of the payload composition (flame or smoke mix). The rapidly expanding gases of the first-fire composition expel the marker and ogive assemblies from the body assembly (B, Figure 4) and then inflate the donut-shaped ballute. The ballute retards the flight of the marker assembly, which descends with the heavier metal canister in a nose-down attitude (C, Figure 4). After the marker lands on water, snow, or mud, the inflated ballute supports the canister in an upright orientation, keeping it afloat (D, Figure 4). Meanwhile, the combustion has transferred from the first-fire mix to the payload composition and the flame/smoke issues from the chimney, which extends from the combustion chamber (canister) through the center of the ballute. The flame signal is emitted for a period of 80 to 100 seconds; the smoke signal is emitted for 60 to 90 seconds.

NOTE: When impacted on hard ground, the ballute tends to hold the marker in a partially upright position (approximately 45°). This tends to reduce the visibility of the flame signal from some directions, but has little effect on the visibility of the smoke signal. These markers tend to burn hotter and faster when the canister is not cooled by submersion; the flame compositions are the hotter and they frequently burn through the uncooled aluminum canister wall in about 60-70 seconds.

CAUTION

A fire hazard exists when either of these markers impacts on flammable materials (grass, leaves, etc.) ... a considerable hazard with the flare but only a slight hazard with the smoke marker. Therefore, prior to firing, the user should evaluate the consequences of starting a fire in the impact area.

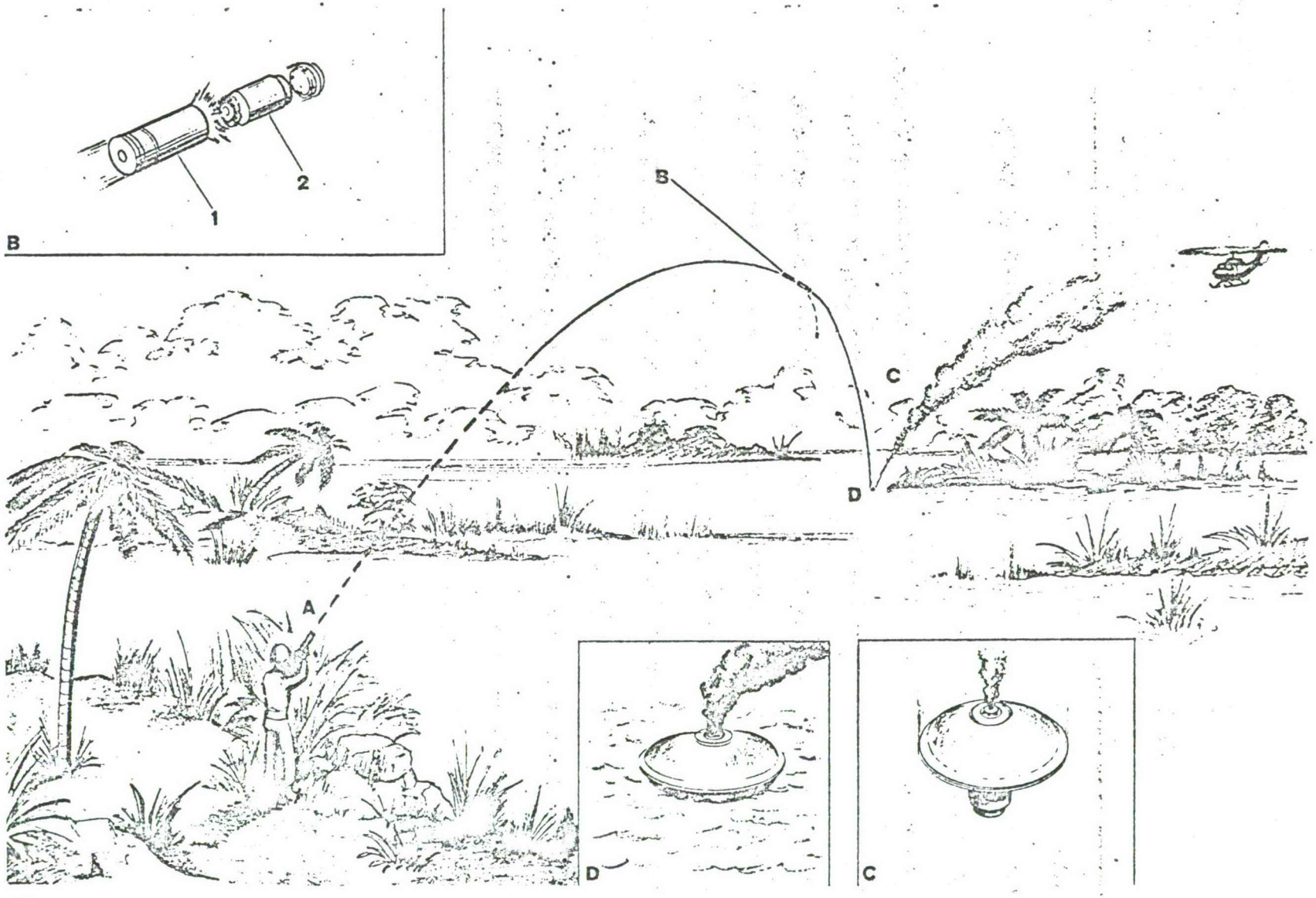


Figure 4. Functioning Sequence of 40mm Floating Signals

6. TABULATED DATA

	Floating Flare	Floating Smoke Marker
a. Cartridge		
Type		
Caliber	40mm	40mm
b. Flight Characteristics		
Range, maximum	280 meters	300 meters
Q.E. (Launch Angle)	32^{o} - 35^{o}	32^{o} - 35^{o}
Delay Before Separation, nominal	5-1/2 seconds	5-1/2 seconds
c. Signal Characteristics		
Colors	yellow green red	yellow green red
Emission Period	80 - 100 seconds	60 - 90 seconds
Visibility Range, Clear Weather	2 miles (night)	2 miles (day)
d. Physical Characteristics		
Weight, Cartridge	0.59 lb.	0.50 lb.
Weight, Projectile	0.48 lb.	0.39 lb.
Length, Cartridge, maximum	5.21 in.	5.23 in.
Diameter, Rim of Case, maximum	1.72 in.	1.72 in.
Diameter, Rotating Band, nominal	1.62 in.	1.62 in.
Diameter, Body, Front, nominal	1.60 in.	1.60 in.

CHAPTER 3

INSTRUCTIONS FOR USE

7. CARE, HANDLING, AND PRESERVATION

a. Ammunition is packed to withstand conditions ordinarily encountered in the field. Care must be observed to keep packing from becoming broken or damaged. All broken packings must be repaired immediately and careful attention given to the transfer of all markings to the new parts. This ammunition is packed in metal boxes and then placed in wooden boxes.

b. When it is necessary to leave ammunition in the open, raise it on dunnage at least 6 inches from the ground and cover it with a double thickness of tarpaulin, leaving enough space for the circulation of air. Where practicable, dunnage strips should be placed under each layer of boxes. Suitable trenches should be dug to prevent water from running under the pile.

c. Since ammunition and explosives are adversely affected by moisture and high temperature, due consideration should be given to (1) and (2) below.

(1) Do not open boxes until ammunition is to be used. Ammunition removed from airtight containers, particularly in damp climates, is apt to corrode, thereby rendering the ammunition unserviceable.

(2) Protect ammunition from high temperature and direct rays of the sun. More uniform firing is obtained if rounds are at the same temperature.

(3) Do not attempt to disassemble the cartridge or any of the components.

(4) The use of oil or grease on cartridges is prohibited.

(5) Ammunition should be protected from sand, mud, moisture, frost, snow, ice, grease, and other foreign matter. If the ammunition gets wet or dirty, it should be wiped off at once. If light corrosion forms on the cartridges, it should be wiped off with a clean dry cloth. However, cartridges should not be polished to make them look better or brighter.

(6) Aluminum cartridge cases are easily dented and should be protected from hard knocks and blows. Dented cartridge cases may cause incomplete obturation, jamming in the chamber, and difficulty in extraction.

(7) Ammunition, when stored, should be segregated by caliber, type, and ammunition lot number.

(8) When only a part of a box of ammunition is used, the ammunition remaining in the box should be protected, against unauthorized handling and use, by firmly fastening the cover of the box in place.

d. When handling this ammunition the precautions contained in TM 9-1300-206 should be observed.

8. PREPARATION FOR FIRING

Cartridges are ready for firing as issued. However, immediately after opening an M2A1 ammunition can, remove the packing materials and inspect the cartridges. If any ogive has been loosened by rough handling, snap it back into place. After the mission, any unfired cartridges shall be returned to their original packing or to suitable packing boxes. The packing boxes should be appropriately marked to indicate the nomenclature of the cartridges, the quantity of the cartridge therein, and the appropriate ammunition lot number. Such cartridges will be used first in subsequent firings, in order that stocks or opened packings may be kept at a minimum.

9. FIRING INSTRUCTIONS

Inspection, loading, and firing procedures shall be in accordance with the sections of the appropriate technical manual entitled, "Operation Under Usual Conditions" and "Operation Under Unusual Conditions" (e.g., Appendix B, extracted from TM 9-1010-221-14).

Aiming procedures are an exception to the procedures used with standard grenades since these signal cartridges are not ballistically matched to the grenades. For maximum range with the floating signals (280 meters for flares; 300 meters for smoke markers), the launcher should be elevated approximately 32°. This quadrant elevation is accomplished by setting the sights at the 375-meter range setting. For shorter ranges, superelevations should be used (see FM 23-31, Appendix VI, "Indirect-Fire Role") because complete separation of the payload from the projectile and full ballute deployment will not occur at lower elevations of fire. Approximate impact ranges on level terrain are shown in the following table.

Elevation of Fire		Range, Meters	
Sight Setting	Angle	Flare	Smoke Marker
350	26-27°	275	290
375	32°	280	300
Top of M79 sight	36-37°	275	290
400 (M203 only)	41-42°	265	280
x	45°	255	270
x	50°	230	245
x	60°	180	195
x	70°	125	135

Wind will have considerable effect upon the flight of the payload after the ballute deploys. Prior to firing, the grenadier should evaluate the wind and compensate for it, whether it is a crosswind or blowing on the same axis as the grenade. Considerable caution should be exercised when a wind exceeding 5 miles per hour is coming from the direction of the target. At superelevations, the wind could carry the marker assembly back onto the launch site.

If necessary (e.g., excessive winds), these cartridges can be fired at lower elevations if water depth exceeds 3 feet (6 feet desirable); separation will occur underwater and, if not stuck in mud, the marker assembly will surface and function normally thereafter.

10. PRECAUTIONS IN FIRING

The following precautions should be closely observed to prevent injury to personnel and/or damage to materiel:

a. The cartridges should be free of sand, mud, moisture, frost, snow, ice, grease, or other foreign matter before insertion into the weapon.

b. Do not fire ammunition which is corroded.

c. Take care at all times to protect the primer and the aluminum ogive since they may be easily dented and should be protected from hard knocks and blows. The fiberboard sleeves used in the packing of these rounds serve this purpose.

d. Do not use cartridges which have been damaged or those having an indication of separation.

e. Do not fire ammunition unless it has been identified by ammunition lot number and the grade.

f. Misfires and hangfires will be handled as indicated in the appropriate operator's or field manual (e.g., Paragraph 2-12 of TM 9-1010-221-14.. see Appendix B).

g. Do not fire these cartridges so that falling components could descend upon friendly troops, thereby possibly causing injury to personnel. The body assembly and the ogive assembly normally fall about 10 meters (maximum of 20 meters) short of the payload impact point.

h. Prior to firing, evaluate the possible consequence of starting a fire in the impact area ... especially if firing the flare cartridge onto dry ground.

i. Considerable caution should be exercised when a wind exceeding 5 miles per hour is coming from the direction of the target. At superelevations, the wind could carry the marker assembly back onto the launch site.

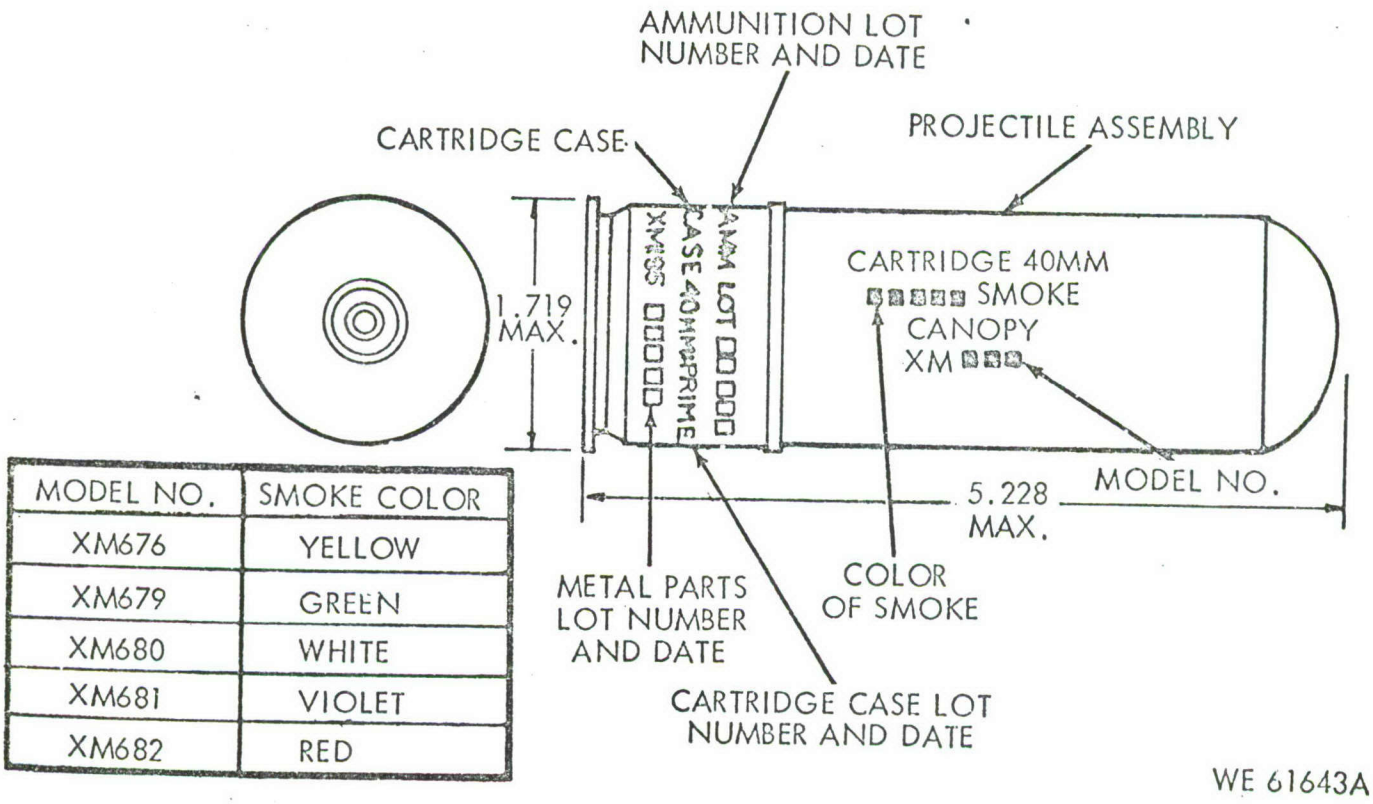
11. PACKING AND MARKING

One packing unit for these floating signals contains 44 rounds. The rounds are individually inserted in fiberboard tubes and 22 cartridges are packaged in each M2A1 metal ammunition box. Desiccant bags and corregated fiberboard fillers are added to assure a tight pack. Two M2A1 boxes are then packed in a wooden wirebound box. Packing and marking is similar to that for the XM583, XM585, XM635, XM661, XM662, XM663, XM664, XM676, XM679, XM680, XM681, and XM682 cartridges as shown in Figures 7-17 thru 7-19 of TM 9-1010-221-14 (Appendix C).

APPENDIX A

MARKING OF CARTRIDGE AND CASE

(Extracted from TM 9-1010-221-14)



MODEL NO.	SMOKE COLOR
XM676	YELLOW
XM679	GREEN
XM680	WHITE
XM681	VIOLET
XM682	RED

Figure 7-8. 40-MM Smoke Canopy Cartridge XM676, XM679, XM680, XM681, and XM682.

APPENDIX B

OPERATION UNDER USUAL AND UNUSUAL CONDITIONS

(Extracted from TM 9-1010-221-14)

Section II. OPERATION UNDER USUAL CONDITIONS

2-4. General

This section contains a step-by-step procedure for operating the grenade launcher under conditions of moderate temperatures and humidity. For operation under unusual conditions, refer to section IV. Pertinent data is indicated in table 2-1.

Table 2-1. Operation of 40-MM Grenade Launcher, M203

Step	Procedure	Reference
1	Installation / removal.	Para 4-10
2	Clearing grenade launcher.	Para 2-5
3	Cleaning before firing.	Para 2-6
4	Service before firing.	Para 2-7, table 3-3
5	Loading.	Para 2-8
6	Firing.	Para 2-9
7	Zeroing.	Para 2-10
8	Misfire, hangfire, and stoppage.	Para 2-11
9	Failure to fire.	Para 2-12, table 2-2
10	Unloading.	Para 2-13
11	Cleaning and lubrication after firing.	Table 3-3, para 3-11 and 3-12

2-5. Clearing Grenade Launcher

The following procedures outline the steps necessary to clear the grenade launcher.

Warning. **Point muzzle clear of all personnel.**

a. Press barrel latch and slide barrel forward until barrel stop is engaged.

b. Inspect chamber for presence of round, expended casing, or other obstruction and remove if present.

2-6. Cleaning Before Firing

The barrel, bore, and chamber should be wiped dry with a clean dry cloth before firing.

2-7. Service Before Firing

Before firing perform the functional checks outlined in paragraph 3-14.

2-8. Loading Procedures

Refer to figure 2-3.

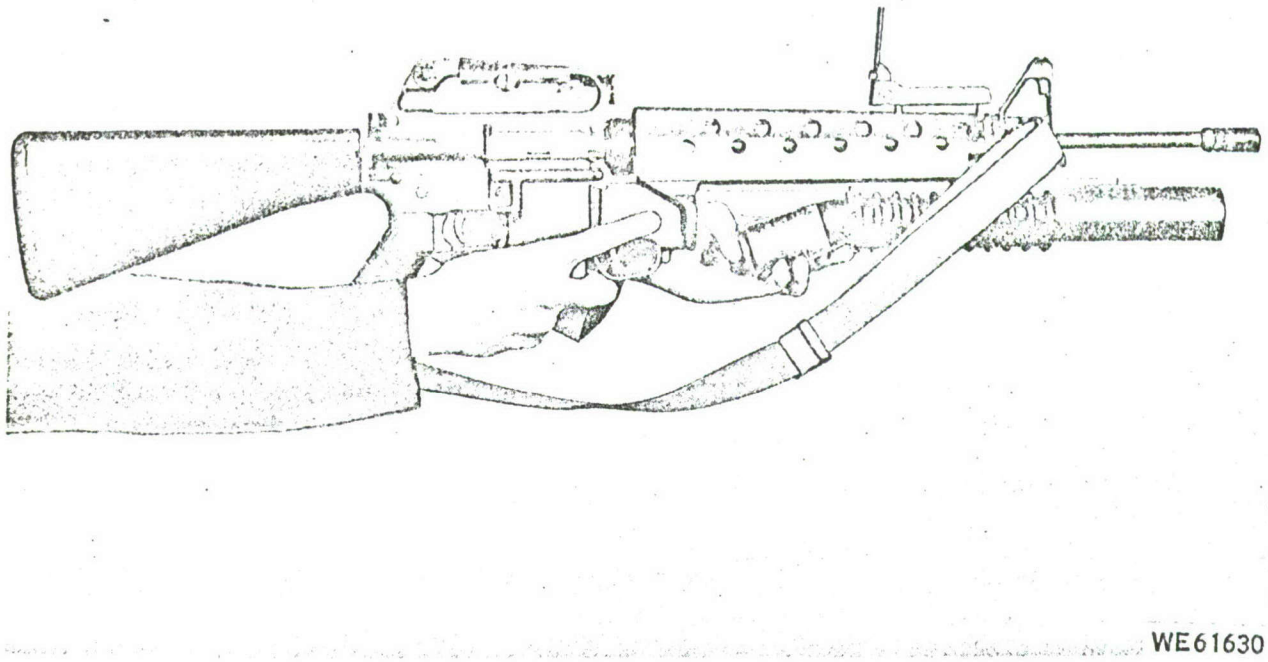


Figure 2-3. Loading grenade launcher.

Warning. **Point muzzle clear of all personnel.**

a. Press barrel latch and slide barrel assembly forward until barrel stop is engaged.

b. Insert cartridge into chamber.

c. Slide barrel assembly rearward sharply until barrel locks.

d. Move safety rearward.

2-9. Firing Procedures

Note. Before firing, perform the before firing operations described in operators preventive maintenance checks and services, table 3-3.

Firing of the grenade launcher may be accomplished from any of the following positions: prone, sitting, kneeling, or standing. For all positions, the firing procedures are as follows:

Warning. **When firing HE grenades at targets within leaf sight ranges of 50-80 meters (165-265 feet), the operator will be in a protected position. Also, targets within 80 meters (265 feet) radius of unprotected friendly troops should not be engaged. The danger radius of the practice grenade is 20 meters (66 feet). In addition, observe precautions and warnings pertaining to the ammunition being used.**

a. With grenade launcher loaded, position weapon and sight.

b. Move safety to fire position.

c. Place butt of stock firmly against shoulder (or the ground when firing long range from prone position), take aim, and squeeze the trigger to fire the weapon.

2-10. Leaf Sight Zeroing Procedures

The following steps outline the procedures necessary to zero the grenade launcher leaf sight.

a. Set up a target at 200 meters.

Note. Zeroing procedures are not to be performed at ranges less than 100 meters. The 50 meter mark on the sight leaf blade is marked in red to emphasize that this range is not be be used in zeroing procedures.

b. Perform the before firing preventive maintenance services listed in table 3-3.

c. Perform loading procedures as specified in paragraph 2-8.

d. Place sight leaf blade in upright position.

e. Choose firing position, preferably a supported prone position.

f. Aline target with appropriate range increment of sight leaf blade and front post sight of M16 or M16A1 Rifle.

g. Perform procedural steps of firing as specified in paragraph 2-9.

h. Make any applicable windage and/or elevation adjustments.

Note. Turning sight windage screw clockwise moves sight leaf to the left. Raising sight leaf increases range and lowering decreases range.

i. Leaf sight adjustments are as follows:

Windage: 1 increment equals 1.5 meters at 200 meters range.

Elevation: 1 increment equals 10 meters at 200 meters range.

Note. The rim of a 40-mm cartridge case may be used to turn the elevation adjustment machine screw.

j. Fire three cartridges and make necessary adjustments after each round.

Note. When three consecutive rounds land within 5 to 10 meters of aiming point, zeroing procedures are complete.

2-11. Misfire, Hangfire, and Stoppage

a. *Misfire.* A misfire is a complete failure to fire. It must be treated as a hangfire until such possibility has been eliminated.

b. *Hangfire.* A hangfire is a delay in the functioning of a propelling charge. The 30 second time interval prescribed in table 2-2 must be observed after failure to fire.

c. *Stoppage.* Stoppage is any interruption in the cycle of operation caused by faulty action of the weapon or ammunition.

2-12 Immediate Action in Case of Failure to Fire

After a failure to fire, due to the possibility of a misfire or hangfire, the precautions listed in table 2-2 are applicable and must be observed until the round has been removed from the weapon and the cause of failure determined.

Table 2-2. Immediate Action in Case of Failure to Fire

Step	Procedure
1	Keep the weapon trained on the target and all personnel clear of the muzzle. *Warning.* **Before attempting to remove the round from the grenade launcher personnel not required for the operation must be cleared from the vicinity.**
2	Wait 30 seconds from the time fo failure to fire before opening the breech for unloading preocedures.
3	Exercise extreme caution during unloading procedures; where circumstances permit, either catch the ejected round or reduce the distance of free fall to ground.
4	After the round has been removed from receiver, store it separately until it has been determined whether the round or the firing mechanism is defective. If the round is defective, it must be kept separated from other rounds until proper disposition. If examination reveals that the firing mechanism is defective, the round may be reloaded and fired after the mechanism is repaired.

2-13. Unloading

To unload the grenade launcher, press the barrel latch and move barrel forward. The expended casing is automatically extracted and ejected.

2-14. Cleaning and Lubrication After Firing

After firing, perform the cleaning and lubrication procedures outlined in paragraphs 3-11 and 3-12.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-22. General

This section contains special instructions for operation under unusual conditions. In addition to normal preventive maintenance service, special care in cleaning and lubrication must be observed where extremes of temperature, humidity, and atmospheric conditions are present or anticipated.

2-23. Operation in Extreme Cold

a. In climates where the temperature is constantly below freezing, it is necessary to prepare the materiel for cold weather operation. Lubricate as specified in paragraph 3-6a.

b. Exercise the various controls through their entire range at the intervals required to aid in keeping them from freezing in place and to reduce the effort required to operate them.

c. When materiel is not in use, pay particular attention to protecting it. Keep snow and ice from the operating parts; provide as much protection as possible. When the grenade launcher is brought from cold outdoor temperature to a heated area, it should be wrapped in a covering of sufficient thickness to allow it to reach "room temperature" gradually. A parka or blanket would provide good covering. If a grenade launcher is brought into a warm area and condensation forms on the surface of the metal, the grenade launcher must be thoroughly cleaned and oiled as soon as it reaches room temperature. A grenade launcher exposed to temperatures that cause condensation must not be taken into below freezing temperatures before the grenade launcher is thoroughly cleaned and oiled as this will cause ice to form in the mechanism and make it inoperative.

2-24. Operation in Extreme Heat

Perform lubrication as specified in paragraph 3-6b.

2-25. Operation in Dusty or Sandy Areas

a. Perform lubrication as specified in paragraph 3-6d.

b. Cover grenade launcher, where possible.

2-26. Operation Under Rainy or Humid Conditions

Perform lubrication as specified in paragraph 3-6c.

2-27. Operation in Salt Water Areas

a. Perform lubrication as specified in paragraph 3-6c.

b. Inspect all parts frequently for rust or corrosion.

APPENDIX C

PACKING AND MARKING
(Figures 7-17 thru 7-19 extracted from TM 9-1010-221-14)

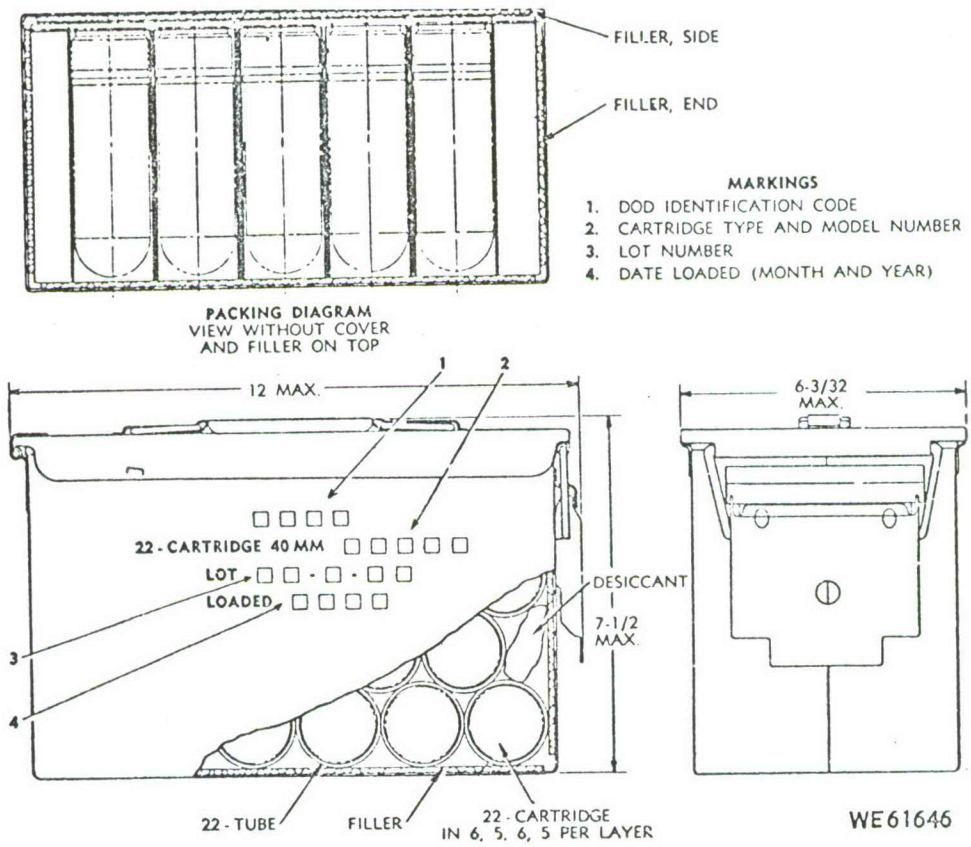


Figure 7-17. Metal ammunition box M2A1 for all pyrotechnic signal and spotting rounds.

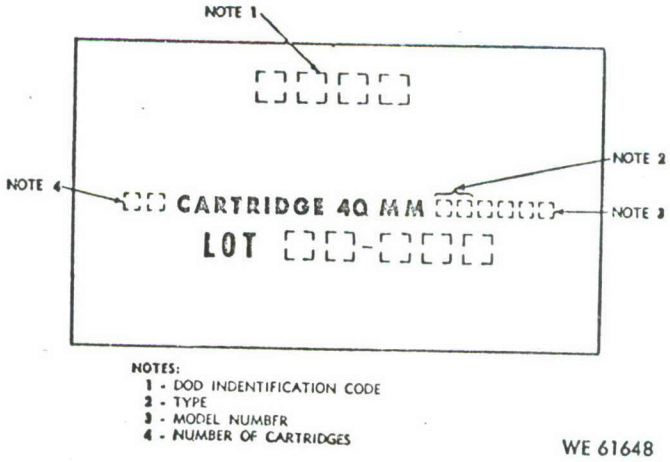


Figure 7-18. Marking on interior package.

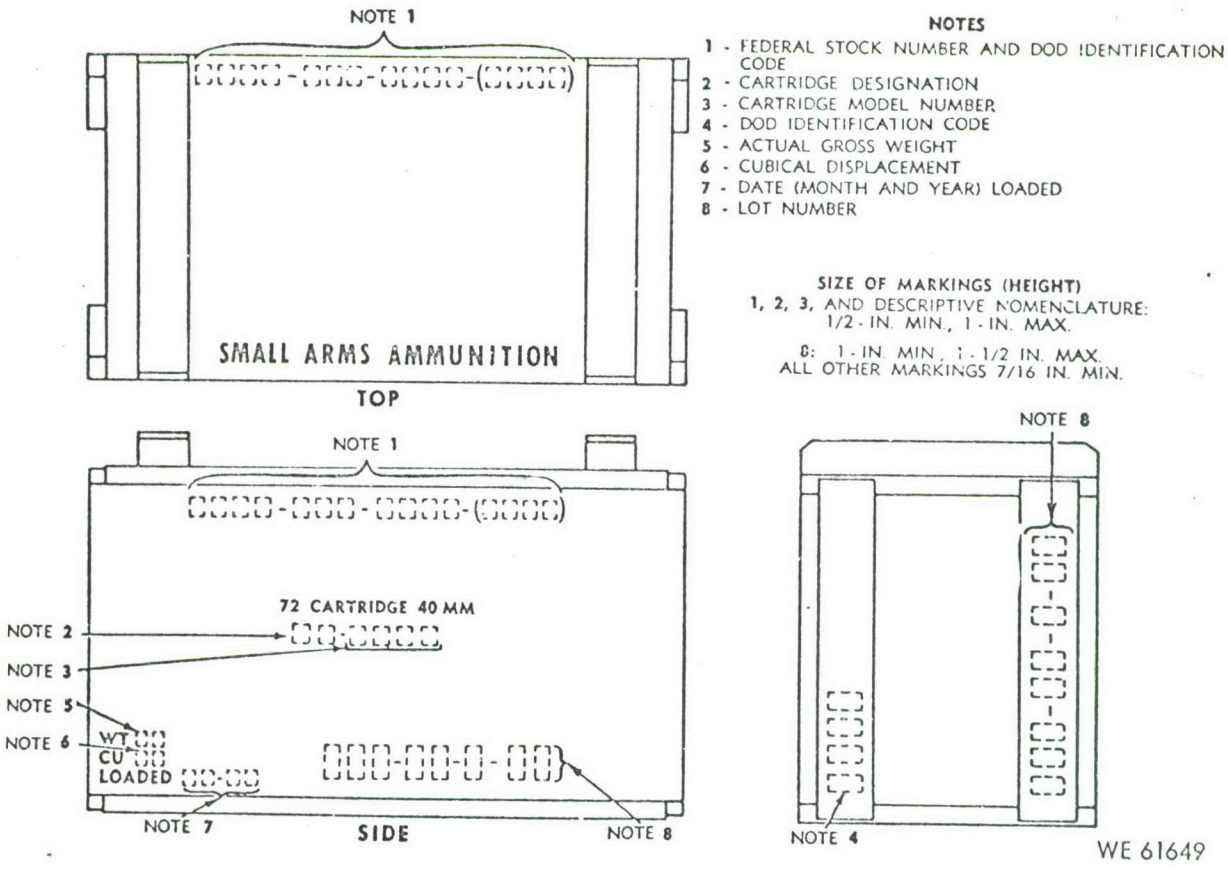


Figure 7-19. Typical markings on wooden packing box.